REMARKS

In the February 2, 2010 Office Action, the Examiner objected to claims 7 and 8, rejected claims 1, 2, 4, and 6 under 35 U.S.C. § 103(a) and being unpatentable over U.S. Patent Publication No. 2002/0128052 to Neagley et al ("Neagley") in view of Potentials, IEEE Volume 18, Issue 4, Oct-Nov 1999, pages 29-33 ("NPL"), and rejected claims 7 and 8 as being unpatentable over U.S. Patent No. 6,509,836 to Ingram "Ingram" in view of NPL, further in view of U.S. Patent No. 4,499,594 to Lewinter "Lewinter "and further in view of Neagley. By this amendment, Applicant clarified claims 7 and 8.

Objection to Claims 7 and 8

The Examiner objected to claims 7 and 8 due to informalities. Office Action at 2. Applicant has made the changes suggested by the Examiner. Therefore the objection is now moot.

Rejection under 35 U.S.C. § 103(a)

The Examiner rejects claims 1, 2, 4, and 6 under 35 U.S.C. § 103(a) as being allegedly unpatentable over the combination of Neagley and NPL. Office Action at 3. The Examiner rejects claims 7 and 8 under 35 U.S.C. § 103(a) as being allegedly unpatentable over the combination of Ingram, NPL, Lewinter, and Neagley. Office Action at 6. Applicant respectfully traverses for at least the following reasons.

With respect to obviousness, several basic factual inquiries must be made in order to determine the obviousness or non-obviousness of claims under 35 U.S.C.

§ 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

(1) Determine the scope and content of prior art;

(2) Ascertain the differences between the prior art and the claims in issue;

(3) Resolve the level of ordinary skill in the pertinent art; and

(4) Evaluate evidence of secondary considerations.

The obviousness or non-obviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; *see also KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1730, 82 U.S.P.Q.2d 1385, 1388 (2007).

Indeed, to establish a *prima facie* case of obviousness, the examiner must:

> make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention.

M.P.E.P. § 2142, 8th Ed., Rev. 6 (Sept. 2007). "The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." *Id.* It is important to note, moreover, that the prior art references relied upon in a rejection "must be considered in its entirety, i.e., as a whole, <u>including portions that would lead away from the claimed invention</u>," when such reasons are articulated by the Examiner. *Graham*, 383 U.S. at 17, 148 U.S.P.Q. at 467; *See also* M.P.E.P. § 2141.03(VI) (emphasis added).

Applicant respectfully submits that such reasons are not present in the rejection of record at least because the references relied upon by the Examiner, when considered as a whole, do not show all of the claimed limitations, nor do they provide no reason that would have prompted a person of ordinary skill in the art to modify and combine the references in the manner suggested by the Examiner. In fact, for the reasons set forth below, Applicant submits that the references, when considered in their entirety, include portions that would discourage the modification and combination suggested by the Examiner.

The modulation of the information content or how the impedance of the reflection is modulated is not shown in the cited references as claimed. NPL discusses using on-off-keying (OOK) modulation. For OOK the modulated reflector is placed in two states: 1) maximum reflectivity or 2) maximum absorption. Maximum reflectivity could be either a “short” (very low impedance) or an""open” (very high impedance). The binary alphabet, either a “one” or “zero” is determined by one to the two state of OOK. Neagley discusses using the two states of Maximum reflectivity or Maximum absorption as well. However, Neagley uses the two states to switch “on” and “off" at a set frequency. Thus by switching between the two states at two different frequencies, the binary alphabet is formed by the selection of frequency. This is Frequency shift keying (FSK) modulation.

The modulation as claimed in independent claims 1, 4, 7, and 8 switches between to maximum reflectivity states, 1) an “open” (very high impedance – near infinity) and 2) a “short” (very low impedance – near zero). These two states reflect the

phase of the impinging electromagnetic field in two different ways. An “open” circuit termination will cause a 180 degree phase shift in the reflected signal. A “short” circuit termination will maintain the same phase orientation as the impinging electromagnetic field. This phase changing property is used to form the binary alphabet. This form of modulation is Binary Phase shift keying (BPSK), where the phase of the return signal is switching between two anti-polar phases. BPSK modulation requires 3 dB less in power level than FSK modulation to demodulate and is also superior to OOK. BPSK modulation needs the lease signal-to-noise ratio for demodulation than the other two forms of modulations discussed in previous work.

Notably, it is not apparent how to implement BPSK modulation for a modulated reflector, and none of the cited references discuss this implementation.

In addition the BPSK signal is placed upon a subcarrier. The subcarrier is created by switching the impedance between the two highly reflective states of different phase return. Figure 3 of the present application shows the method to create the subcarrier BPSK signal using a square-wave generator and multiplying the square-wave signal against a bipolar data stream. This results in a square wave at a single frequency that may or may not change phase for M cycles. Thus M cycles of the square wave maybe in one phase and the next M cycles could be at the same or different phase. A single cycle of a square wave will cause numerous cycle of the interrogating electromagnetic wave to be reflected first in one phase and then 180 degrees opposite in phase. The phase transitions marks a single cycle of square wave.

If the phase transition does not occur at a time corresponding to one square wave cycle, then the phase of the square wave was changed and the binary symbol has changed.

The subcarrier BPSK signal allows for multiple uses of the modulated reflector technology. First a signal transmitter/receiver would be able to interrogate multiple modulated reflectors given that each modulated reflector had a different subcarrier frequency. Furthermore, by using code division multiplexing, modulated reflectors with the same subcarrier frequency can be separated.

Ingram discusses modulation control and that Code Division Multiplexing can be used but does not discuss how to achieve phase modulation with a modulated reflector. The diagram, Figure 2A, in Ingram depicts a reflective and absorptive modulation for the impedance. The discussed "open" and "closed" states refer to the switch used to modulate the reflectance and perhaps not the "open" and "short" circuits of the modulated reflector impedance.

A discussion of the differences between the cited references and the claim limitation follows:

Regarding Claim 1:

Neagley uses a voltage controlled square-wave oscillator to implement FSK modulation where the impedance is switch between reflection and absorption. Thus half the energy that is used to interrogate the modulated reflector is not reflected back, but lost. The claimed invention uses BPSK and reflects back all the energy possible to the interrogating source.

The NPL document discusses switch between reflection and absorption. The claimed invention switches between two reflection states, in which the phases are different. BPSK modulation requires less SNR than OOK and FSK for successful demodulation. Also BPSK reflects a great amount of energy than the cited references that use absorption.

Regarding Claim 2:

Neagley uses a power splitter or similar device to control the impedance matching. While the claimed invention shows an impedance switch, which could be a PIN Diode or RF FET transistor, the power splitter performs another purpose. The use of the power splitter is to control how much power is output or reflected back. By utilizing a power splitter(s) the BPSK-modulated reflections is not altered except for the power level.

Regarding Claim 4:

Neagley uses a voltage controlled square-wave oscillator to implement FSK modulation where the impedance is switch between reflection and absorption. Thus half the energy that is used to interrogate the modulated reflector is not reflected back, but lost. The claimed invention uses BPSK and reflects back all the energy possible to the interrogating source.

NPL discusses switch between reflection and absorption. The claimed invention switches between two reflection states, in which the phases are different. BPSK modulation requires less SNR than OOK and FSK for successful demodulation. Also

BPSK reflects a great amount of energy that the other two document that use absorption.

Regarding Claim 6:

Neagley uses a power splitter or similar device to control the impedance matching. While the claimed invention shows an impedance switch, which could be a PIN Diode or RF FET transistor, the power splitter performs another purpose. The use of the power splitter is to control how much power is output or reflected back. By utilizing a power splitter(s) the BPSK-modulated reflections is not altered except for the power level.

Regarding Claim 7:

Ingram discusses modulation control and that Code Division Multiplexing can be used but does not discuss how to achieve phase modulation with a modulated reflector. The diagram, Figure 2A, in the pending application depicts a reflective and absorptive modulation for the impedance. The discussed “open” and “closed” states refer to the switch used to modulate the reflectance and not the “open” and “short” circuits of the modulated reflector impedance. A “closed” state does not mean “short circuit” impedance.

Regarding Claim 8:

Claim 8 recites that the impedance match of the modulated reflector must be switched between “open” circuit and “short” circuit. None of the cited references disclose this limitation.

In view of the foregoing remarks, Applicant submits that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicant therefore requests the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Respectfully submitted,

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